APPENDIX A

SPECIAL PROJECT OPERATIONS AND STUDIES

APPENDIX A: BONNEVILLE

Bonneville Dam[1]

1. Special Project Operations.

RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spring Creek Hatchery Release. The first hatchery release is expected to occur in mid-March, followed by special operations for juvenile fish passage as coordinated with the fisheries agencies through TMT. Project operations for fish passage will be defined by RCC teletype prior to the release.

1.2. Spill. Spill will be provided continuously from April 10 through August 31 for spring and summer migrants as required in the NMFS Biological Opinions. An evaluation of the daytime spill cap (75 kcfs) versus daytime spill to the gas cap is planned for 2003. Table SPO-BON-1 outlines the schedule for this test, which consists of a randomized 4-day block design (2-day treatments).

2. Studies.

2.1. Bonneville Rehab Biological Testing (also testing under the Turbine Survival Program. Main unit 5 will be commission tested once it returns to service in August 2002. The unit will undergo a series of pre-startup tests that will require the unit's STSs to be removed. A normal pre-start scenario is to mechanically roll the unit for 1 day. After the unit has been deemed structurally sound, the unit will be HIPOT tested for 2-3 days. After this test series is complete the unit is subjected to several load rejection tests that require the STSs to be removed (2 days). The unit's STSs will be reinstalled and then be advanced to a 72 hour run test, followed by the 100 day commissioning test.

2.2. Lower Columbia River Adult Study. Adult salmon (1,100 spring/summer chinook and 1,100 fall chinook) and 1,100 steelhead will be captured at the adult fish monitoring facility and tagged with radio transmitters from April through October 2003. A total of 300 lamprey will be trapped and freeze branded to be used to evaluate the prototype lamprey bypass in Bradford Island ladder make-up water channel. In addition to assessing general migration characteristics, there

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are two salmon and steelhead elements that are specific to Bonneville Dam. They are an evaluation of passage and fallback with the new spill pattern and deflectors installed at the spillway. Forebay and tailrace tracking access to boat restricted zones (BRZ) will be required. For the spillway fallback evaluation, we will compare fallback rates between high and low spill periods. This test will utilize a randomized block design, with 2-day treatments within 4-day blocks. The test will run the entire spill period, 10 April – 31 August, using the schedule shown in Table SPO-BON-1. Routine maintenance and installation of telemetry equipment will occur during the winter maintenance period and be coordinated with appropriate project personnel. No special operations are anticipated during the spill season to maintain or install telemetry equipment.

2.3. Route Specific Survival Evaluation. There will only be route specific survival evaluations in 2003, and only at B1 in the spring and summer. We will evaluate survival of spring chinook salmon through (1) the B1 ice and trash sluiceway, and (2) through an MGR turbine unit. We will evaluate survival of fall chinook salmon through the B1 ice and trash sluiceway. Specific unit for turbine survival evaluations have not yet been determined. It is expected that the unit that is being used for turbine survival testing will need to be shut down for release pipe/hose installation, and potentially in-season fixes. Due to the potential for a low water year and potential for changes in operations that could effect presently planned survival research contingency plans are being formulated for discussions with regional fishery managers.

2.4. Flat Plate PIT Tag Detection of Juvenile Salmonids at the First Powerhouse Smolt Monitoring DSM. The installation and testing of this equipment is not expected to require any special project operations. However, since this program is in the developmental phase, and water control within the DSM is questionable, possible problems with the operation may arise. In the case of needed repairs to the system, one or two occasions of one or two-hour reversal of flow through this system may be required to adjust the equipment. No serious effects to fish passage are expected.

2.5. Yearling Chinook Delayed Mortality Evaluation. A study to assess the effects of juvenile fish transportation and passage through bypass systems will be conducted at the Second Powerhouse Smolt Monitoring Facility. Yearling chinook will be captured at the facility and placed into holding tanks supplied with artificial seawater. Fish will be held in these tanks from 4-6 months. This study will run from April through

December and will not require any special operations.

Table SPO-BON-1. Daytime spill treatments for evaluating adult passage at Bonneville Dam in 2003. Two-day treatments alternate between the existing 75 kcfs daytime cap and spill to the 120% TDG cap. See Table BON 6 for daytime spill hours.

Date	Spill Treatment	Date	Spill Treatment	Date	Spill Treatment	Date	Spill Treatment
10-Apr-03	Low	16-May-03	High	21-Jun-03	Low	27-Jul-03	Low
11-Apr-03	Low	17-May-03	High	22-Jun-03	Low	28-Jul-03	Low
12-Apr-03	High	18-May-03	Low	23-Jun-03	High	29-Jul-03	High
13-Apr-03	High	19-May-03	Low	24-Jun-03	High	30-Jul-03	High
14-Apr-03	Low	20-May-03	High	25-Jun-03	High	31-Jul-03	High
15-Apr-03	Low	21-May-03	High	26-Jun-03	High	1-Aug-03	High
16-Apr-03	High	22-May-03	Low	27-Jun-03	Low	2-Aug-03	Low
17-Apr-03	High	23-May-03	Low	28-Jun-03	Low	3-Aug-03	Low
18-Apr-03	High	24-May-03	High	29-Jun-03	Low	4-Aug-03	High
19-Apr-03	High	25-May-03	High	30-Jun-03	Low	5-Aug-03	High
20-Apr-03	Low	26-May-03	Low	1-Jul-03	High	6-Aug-03	Low
21-Apr-03	Low	27-May-03	Low	2-Jul-03	High	7-Aug-03	Low
22-Apr-03	High	28-May-03	Low	3-Jul-03	Low	8-Aug-03	Low
23-Apr-03	High	29-May-03	Low	4-Jul-03	Low	9-Aug-03	Low
24-Apr-03	Low	30-May-03	High	5-Jul-03	High	10-Aug-03	High
25-Apr-03	Low	31-May-03	High	6-Jul-03	High	11-Aug-03	High
26-Apr-03	Low	1-Jun-03	Low	7-Jul-03	High	12-Aug-03	Low
27-Apr-03	Low	2-Jun-03	Low	8-Jul-03	High	13-Aug-03	Low
28-Apr-03	High	3-Jun-03	High	9-Jul-03	Low	14-Aug-03	High
29-Apr-03	High	4-Jun-03	High	10-Jul-03	Low	15-Aug-03	High
30-Apr-03	High	5-Jun-03	Low	11-Jul-03	High	16-Aug-03	High
1-May-03	High	6-Jun-03	Low	12-Jul-03	High	17-Aug-03	High
2-May-03	Low	7-Jun-03	High	13-Jul-03	Low	18-Aug-03	Low
3-May-03	Low	8-Jun-03	High	14-Jul-03	Low	19-Aug-03	Low
4-May-03	High	9-Jun-03	Low	15-Jul-03	High	20-Aug-03	High
5-May-03	High	10-Jun-03	Low	16-Jul-03	High	21-Aug-03	High
6-May-03	Low	11-Jun-03	High	17-Jul-03	Low	22-Aug-03	Low
7-May-03	Low	12-Jun-03	High	18-Jul-03	Low	23-Aug-03	Low
8-May-03	Low	13-Jun-03	Low	19-Jul-03	Low	24-Aug-03	Low
9-May-03	Low	14-Jun-03	Low	20-Jul-03	Low	25-Aug-03	Low
10-May-03	High	15-Jun-03	High	21-Jul-03	High	26-Aug-03	High
11-May-03	High	16-Jun-03	High	22-Jul-03	High	27-Aug-03	High
12-May-03	Low	17-Jun-03	Low	23-Jul-03	High	28-Aug-03	Low
13-May-03	Low	18-Jun-03	Low	24-Jul-03	High	29-Aug-03	Low
14-May-03	High	19-Jun-03	High	25-Jul-03	Low	30-Aug-03	High
15-May-03	High	20-Jun-03	High	26-Jul-03	Low	31-Aug-03	High

2.6. Sluice Passage Behavior Monitoring at Bonneville First Powerhouse. Fish passage behavior and hydraulic characteristics will be monitored around the sluice entrance at the Bonneville first powerhouse using an acoustic camera, acoustic Doppler current profiler, and an acoustic Doppler velocimeter. No special operations are anticipated for this monitoring.

2.7. Gap Loss Evaluation at Bonneville Second Powerhouse. In 2003, gatewell gap loss will be evaluated at units 13, 15, and 17 at the Bonneville second powerhouse. An acoustic camera will be deployed in a down-looking orientation to estimate proportions of juvenile salmonids that enter the gatewell versus those that pass through the gap between to top of the STS and the bottom of the vertical barrier screen panel. Six modified gatewells (three each at units 15 and 17) and the three unmodified gatewells of Unit 13 will be evaluated. Sampling will occur for three 24-hour periods per intake each season. Intakes 17A, 17B, and 17C will be sampled one additional day each in summer after turbine intake extensions are removed. Additionally, during both spring and summer, extensive underwater infrared video sampling of one unit will be performed to confirm the presence of fish passing through the slot at one unmodified intake (yet to be determined).

2.8. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: THE DALLES

The Dalles Dam[1]

1. Special Project Operations

RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill will be provided continuously from April 10 through August 31 for spring and summer migrants as required in the NMFS BiOp. Special spill patterns have been developed (Table 1. SPO TDA) for a spring balloon-tag survival and injury study. To the extent possible, these patterns will adhere to the 2000 BiOp level of 40% total river discharge.

2. Studies.

In 2003, juvenile salmonid spill passage survival studies, and an evaluation of smolt distribution in the forebay will be conducted. The focus of spillway survival work in 2003 will be to determine the effect of spillway discharge on direct injury and survival at a typical spring (high) tailwater elevation. This information is needed to help determine the location of a spillway training wall, which is an alternative for improving spill passage survival.

2.1. Project Survival Evaluation. Survival and injury estimates for spillway passed fish will be generated using balloon tag techniques. Test fish will be passed through bays 2 and 4 via release hoses. Control fish will be released downstream of the end sill via a hose. Spill patterns for four per-bay discharges (9, 12, 18 and 21 Kcfs) have been developed to approximate stilling basin hydraulic conditions that would occur below bays 2 and 4 as if there were a training wall running from pier 7 to the endsill (Table 1. SPO TDA). Each pattern is set at a fixed volume of spill that would equal approximately 40% of total river discharge for an anticipated 250 Kcfs river flow. If actual river flows are lower, spill during test periods will be higher than 40% and if actual river discharge during testing is higher, spill percent will be less than 40% during testing. During testing, which will occur from 0700-1900 hours for approximately a 21-day period between May 12 and June 7, it will be important to maintain an 80’ msl (±1’) tailwater. Testing for the 9, 12, and 18 Kcfs treatments will last approximately 6 days/discharge. For the 21 Kcfs treatment, approximately three days of testing will be

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required. The specific start date for the study will be selected no later than April 15. At the conclusion of testing each day, the normal juvenile spill pattern will resume. To conduct these evaluations, tailrace BRZ access is required. The hydraulic environment encountered by test fish in the tailrace will be characterized using autonomous sensors released through spillway hoses.

Table 1. SPO-TDA. Test spill patterns for 2003.

Bay	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Spill	River	%
9 kcfs/bay	8	9	9	9	9	9	9	12	15	12	6	4.5	0	0	0	0	0	111.5	278.75	40
12 kcfs/bay	9	12	12	12	12	15	12	12	12	0	0	0	0	0	0	0	0	108	270	40
18 kcfs/bay	9	18	18	18	18	21	0	0	0	0	0	0	0	0	0	0	0	102	255	40
21 kcfs/bay	4.5	21	6	6	6	6	6	6	6	12										

2.2. Forebay Fish Distribution and FPE Evaluation. Vertical and horizontal distribution of fish entering the forebay of The Dalles Dam will be estimated in 2003 using both fixed and mobile hydroacoustics. Radio telemetry techniques will be used to estimate FPE. Additionally, small barges equipped with radio telemetry receivers will be anchored in the forebay to further evaluate the forebay behavior of radio-tagged fish entering the forebay released above John Day Dam. Forebay BRZ access will be necessary to collect hydroacoustic data and download radio telemetry data.

2.3. Sluice Operations Evaluation. East vs. west sluice gate operation will be evaluated in 2003. Sluice gates at units 1 (1-1, 1-2, 1-3) and 17/18 (17-3, 18-1, 18-2) will be operated alternately to evaluate fish passage under each operation. Additionally, the operation of overhead lights located at sluice gates 1-1,2,3 and 17-3, 18-1,2 will be evaluated to determine if sluice passage can be further optimized with either lights on or lights off operation. The study will follow a random block design with east/west sluice and on/off light treatments following the schedule in **Table 2, SPO-TDA.** East/west and lights on/off treatments will be changed at 0800 hours. Main units 1, 17, and 18 will be operated continuously and at a constant load during the east vs. west sluice evaluation (June 1- July 14). Fish passage behavior and hydraulic characteristics will be monitored around sluice entrances using an acoustic camera, acoustic Doppler current profiler, and an acoustic Doppler velocimeter. No special operations are anticipated for this monitoring.

Table 2. SPO-TDA. Sluice gate and light treatment schedule 2003.

Block	Spring Date	Day of Week	Sluice Treatment	Light Treatment	Study Day	Summer Date	Day of Week	Sluice Treatment	Light Treatment	Study Day
1	18-Apr	Fri	West	On	1	1-Jun	Sun	East	On	45
1	19-Apr	Sat	West	Off	2	2-Jun	Mon	East	Off	46
1	20-Apr	Sun	West	Off	3	3-Jun	Tue	West	On	47
1	21-Apr	Mon	West	On	4	4-Jun	Wed	West	Off	48
2	22-Apr	Tue	West	On	5	5-Jun	Thr	West	Off	49
2	23-Apr	Wed	West	Off	6	6-Jun	Fri	West	On	50
2	24-Apr	Thu	West	Off	7	7-Jun	Sat	East	On	51
2	25-Apr	Fri	West	On	8	8-Jun	Sun	East	Off	52
3	26-Apr	Sat	West	Off	9	9-Jun	Mon	West	Off	53
3	27-Apr	Sun	West	On	10	10-Jun	Tue	West	On	54
3	28-Apr	Mon	West	Off	11	11-Jun	Wed	East	On	55
3	29-Apr	Tue	West	On	12	12-Jun	Thu	East	Off	56
4	30-Apr	Wed	West	Off	13	13-Jun	Fri	East	On	57
4	1-May	Thu	West	On	14	14-Jun	Sat	East	Off	58
4	2-May	Fri	West	On	15	15-Jun	Sun	West	Off	59
4	3-May	Sat	West	Off	16	16-Jun	Mon	West	On	60
5	4-May	Sun	West	On	17	17-Jun	Tue	East	Off	61
5	5-May	Mon	West	Off	18	18-Jun	Wed	East	On	62
5	6-May	Tue	West	Off	19	19-Jun	Thu	West	On	63
5	7-May	Wed	West	On	20	20-Jun	Fri	West	Off	64
6	8-May	Thu	West	On	21	21-Jun	Sat	West	On	65
6	9-May	Fri	West	Off	22	22-Jun	Sun	West	Off	66
6	10-May	Sat	West	Off	23	23-Jun	Mon	East	Off	67
6	11-May	Sun	West	On	24	24-Jun	Tue	East	On	68
7	12-May	Mon	West	Off	25	25-Jun	Wed	West	Off	69
7	13-May	Tue	West	On	26	26-Jun	Thu	West	On	70
7	14-May	Wed	West	On	27	27-Jun	Fri	East	On	71
7	15-May	Thu	West	Off	28	28-Jun	Sat	East	Off	72
8	16-May	Fri	West	Off	29	29-Jun	Sun	East	On	73
8	17-May	Sat	West	On	30	30-Jun	Mon	East	Off	74
8	18-May	Sun	West	Off	31	1-Jul	Tue	West	Off	75
8	19-May	Mon	West	On	32	2-Jul	Wed	West	On	76
9	20-May	Tue	West	On	33	3-Jul	Thu	West	Off	77
9	21-May	Wed	West	Off	34	4-Jul	Fri	West	On	78
9	22-May	Thu	West	Off	35	5-Jul	Sat	East	On	79
9	23-May	Fri	West	On	36	6-Jul	Sun	East	Off	80
10	24-May	Sat	West	On	37	7-Jul	Mon	East	On	81
10	25-May	Sun	West	Off	38	8-Jul	Tue	East	Off	82
10	26-May	Mon	West	On	39	9-Jul	Wed	West	Off	83
10	27-May	Tue	West	Off	40	10-Jul	Thu	West	On	84
11	28-May	Wed	West	Off	41	11-Jul	Fri	East	On	85
11	29-May	Thu	West	On	42	12-Jul	Sat	East	Off	86
11	30-May	Fri	West	On	43	13-Jul	Sun	West	On	87
11	31-May	Sat	West	Off	44	14-Jul	Mon	West	Off	88

2.4. Adult Salmon and Steelhead Passage Evaluations. Radio telemetry will be used to monitor for adult salmon and steelhead as part of a basin-wide adult passage study. There are no tests specific to The Dalles Dam for this study and no special operations required.

2.5. Equipment Installation and Maintenance. Installation of hydroacoustic transducers and radio telemetry equipment will begin in March at The Dalles Dam. Installation of hydroacoustic transducers at intakes 1-1, 1-2, 1-3, 17-3, 18-1, and 18-2 will be performed by divers and thus require appropriate outages of adjacent units. Additionally, limited pre-season inspection of radio telemetry equipment will be necessary during these dives. Dates for these installations and inspections are pending. In-season outages may also be required to repair or replace damaged equipment.

Equipment will be removed in early August with procedures and outages similar to the installation outages discussed above, if removal can be accomplished without manipulating the spill schedule. Equipment removal will be delayed until after the spill season if necessary to prevent interruptions to other ongoing evaluations.

2.6. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG) prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: JOHN DAY

John Day Dam[1]

1. Special Project Operations.

1.1. Spill. Spill will be provided from April 10 through August 31 for spring and summer migrants as required in the NMFS Biological Opinions or as modified to meet test conditions described in paragraph 2. Between May 15 and July 31, spill will occur from 1900 to 0600 hours (11 hours total). Before and after that time period, spill will be for 12 hours nightly, from 1800 to 0600 hours. At project flows up to 300,000 cfs, spill discharges will be 60% of instantaneous project flow. Above 300,000 cfs project flow, spill discharges will be 180,000 cfs (up to the hydraulic limit of the powerhouse). Spill will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation conditions.

2. Studies.

At the time of FPP publication, regional coordination for spill and survival studies at John Day Dam was ongoing. Although the studies described below represent the current proposal, they may be modified upon completion of the regional coordination.

2.1. Project Survival and Fish Passage Efficiency Studies. Radio telemetry techniques will be used to evaluate fish passage and survival at John Day Dam in 2003. Two nighttime (12-hour) spill conditions will be compared during the spring migration (April – June) to optimize project passage survival. These two spill levels will follow a randomized block design similar to the summer study (Table SPO-JDA-1) with 2-day treatments of alternating spill. Specific spill levels have not been determined at the time of this draft. These spill levels are being developed through hydraulic model studies in coordination with the Studies Review Work Group. In the summer (June - July), two spill conditions will be compared in response to the BiOp measure to evaluate 12 vs. 24-hour spill effectiveness at John Day Dam. The summer test spill treatments are outlined in Table SPO-JDA-1. The exact start and end dates of the summer study may vary slightly from those in Table SPO-JDA-1, as they depend on fish availability and river temperature. These dates will be coordinated with the Region prior to the test period. Special operations required to support the survival and FPE studies will be conducted

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outside of the juvenile fish migration period to the extent practicable.

Table SPO-JDA-1. Spill treatments for evaluating 12 versus 24-hour spill at John Day Dam during the summer, 2003.

Date	Spill Treatment	Date	Spill Treatment	Date	Spill Treatment
9-Jun-03	30 day/30 night	26-Jun-03	0 day/60 night	13-Jul-03	30 day/30 night
10-Jun-03	30 day/30 night	27-Jun-03	30 day/30 night	14-Jul-03	30 day/30 night
11-Jun-03	0 day/60 night	28-Jun-03	30 day/30 night	15-Jul-03	0 day/60 night
12-Jun-03	0 day/60 night	29-Jun-03	30 day/30 night	16-Jul-03	0 day/60 night
13-Jun-03	30 day/30 night	30-Jun-03	30 day/30 night	17-Jul-03	30 day/30 night
14-Jun-03	30 day/30 night	1-Jul-03	0 day/60 night	18-Jul-03	30 day/30 night
15-Jun-03	0 day/60 night	2-Jul-03	0 day/60 night	19-Jul-03	30 day/30 night
16-Jun-03	0 day/60 night	3-Jul-03	30 day/30 night	20-Jul-03	30 day/30 night
17-Jun-03	30 day/30 night	4-Jul-03	30 day/30 night	21-Jul-03	0 day/60 night
18-Jun-03	30 day/30 night	5-Jul-03	0 day/60 night	22-Jul-03	0 day/60 night
19-Jun-03	0 day/60 night	6-Jul-03	0 day/60 night	23-Jul-03	0 day/60 night
20-Jun-03	0 day/60 night	7-Jul-03	0 day/60 night	24-Jul-03	0 day/60 night
21-Jun-03	30 day/30 night	8-Jul-03	0 day/60 night	25-Jul-03	30 day/30 night
22-Jun-03	30 day/30 night	9-Jul-03	30 day/30 night	26-Jul-03	30 day/30 night
23-Jun-03	0 day/60 night	10-Jul-03	30 day/30 night	27-Jul-03	30 day/30 night
24-Jun-03	0 day/60 night	11-Jul-03	0 day/60 night	28-Jul-03	30 day/30 night
25-Jun-03	0 day/60 night	12-Jul-03	0 day/60 night	29-Jul-03	0 day/60 night
				30-Jul-03	0 day/60 night

Juvenile salmonids will be captured and held at the John Day Dam smolt monitoring facility for radio tagging. Boat access to the tailrace BRZ will be required during the study to mobile track radio-tagged fish. Radio telemetry evaluations will occur from April 15 through July 22 with a one-week break about the first week of June.

2.2. Modified Extended Length Bar Screen Evaluations (ESBS). In 2003, ESBS evaluations will focus on the evaluating smolt condition after passage through the modified gatewell. Pending repair of the existing vertical barrier screens, periodic smolt condition tests will be conducted in unit 7 from approximately April 14 to June 20. PIT-tagged fish will be captured at the smolt monitoring facility and examined for descaling and injury.

2.3. Adult Salmon and Steelhead Passage Evaluations. Radio telemetry techniques will be used to evaluate adult salmon and steelhead passage through the project. Adult salmon and steelhead fallback rates will be evaluated during spill for juvenile passage studies. The specific spill levels and duration for these studies are in Table SPO-JDA-1. A modified section of the south ladder and the floating orifice gates in the collection channel will be outfitted with additional antennae and passage assessed. Downstream migration of post-

spawn steelhead (kelts) will be evaluated using PIT tags and radio telemetry at John Day Dam.

2.4. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: MCNARY

McNary Dam[1]

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season, in accordance with spill specifications in the NMFS BiOp (Appendix E) as updated in 2003 through the TMT Water Management Plan.

1.2. New Spill Patterns. Additional spillway deflectors for bays 1, 2, 21, and 22 were constructed during the winter of 2001-02. Interim spill patterns were used in 2002. New spill patterns will be implemented in 2003 (Table MCN-5). The new patterns were developed through modeling studies at the Waterways Experiment Station and regional coordination.

1.3. Doble Tests. Three transformer banks and their respective turbine units will be taken out of service for Doble testing in 2003: T2, April 14 to 24, units 3 and 4; T3, August 25 to September 11, units 5 and 6; T5, September 22 to October 9, units 9 and 10.

1.4. Upgrade of Tilting Weirs. The control and electrical systems for the tilting weirs in the Washington shore fish ladder will be upgraded in 2003. This requires a ladder outage from January 6 to February 3. To ensure that the weirs operate properly after the new systems are installed, the forebay will be briefly fluctuated through its full operating range (335 to 340 feet msl) in March. Similar work will be done in the Oregon shore ladder in 2004.

2. Studies.

2.1. Evaluation of Juvenile Fish Transportation Versus In-River Survival. The Juvenile Fish Transportation Program will be evaluated at McNary in 2003. Columbia River juvenile fish PIT tagged and released at upstream mid-Columbia hatcheries will either be placed into barges or returned to the river via the primary bypass pipe. The facility will be operated between primary bypass and transportation mode by switching the primary bypass gate on an every other day schedule. During the transport mode of operation only designated PIT tagged research fish will be transported while all remaining PIT tagged and run-of-river fish will be bypassed during the spring/summer chinook, steelhead and early fall chinook outmigration. A potential mid and late

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fall chinook transport evaluation may be conducted under the routine BiOp operations.

2.2. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. The Idaho Cooperative Fisheries Research Unit will monitor the passage of adult salmonids through the hydrosystem. The study requires the installation of radio receivers and data loggers throughout the fishways and various locations on the dam. The installation of equipment will take place prior to the fish season and is not anticipated to require special project operations.

2.3. Evaluation of Steelhead Kelt Migration. Downstream migration of post-spawn steelhead (kelts) will be evaluated using PIT tags at McNary Dam. As part of this evaluation, adult steelhead passing through the juvenile bypass system will be diverted to the adult holding tank, identified as pre- or post-spawn, and enumerated. To evaluate returns of river run kelts, approximately 2000 will be PIT tagged and released to the river.

2.4. Ice Harbor Spillway Survival Study. Radio-tagged juvenile chinook salmon will be used to determine spillway survival at Ice Harbor Dam. Monitoring of these fish will continue at McNary Dam to estimate survival and passage efficiencies. Radio antennas will be mounted in pier nose pipes, and antennas will be attached to all ESBSs prior to deployment. No special operations are anticipated for this study.

APPENDIX A: ICE HARBOR

Ice Harbor Dam[1]

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons, in accordance with spill specifications in the NMFS BiOp (Appendix E) as updated in 2003 through the TMT Water Management Plan. Special spill patterns and discharges will be used for passage and survival studies, as discussed in 2.1 below. These conditions will be developed through FFDRWG and SRWG. Also, special daytime or nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges.

1.2. Doble Tests. To complete Doble testing in 2003, line 3 and turbine units 5 and 6 will be taken out of service from September 9 to 11. A partial outage of line 1 will occur from September 30 to October 2, requiring an outage of unit 1.

1.3. Installation of New AWS Pumps and Ladder Diffusers. Two new AWS pumps and new diffusers will be installed in the north shore ladder. This requires an extended ladder outage from December 1, 2002 to February 28, 2003. A third new AWS pump will be installed during the March-April time frame. Since the new pumps will be 50% larger than the three existing ones, only two pumps will be needed to meet fishway operating criteria.

1.4. AWS Pump Maintenance. The eight AWS pumps for the south shore ladder will have their butterfly valves rehabbed and hydraulic system upgraded. About two to three weeks of work will be required in the January-February time frame.

1.5. Installation of Adult PIT Tag Detectors. PIT tag detection systems will be installed in both fish ladders. Work in the north ladder will require two to three weeks, about midway through the extended ladder outage mentioned in 1.3 above. Work in the south ladder will require a ladder outage from January 27 to February 18; both ladders will be out of service at this time. The Idaho Cooperative Fisheries Research Unit will evaluate the performance of the new detectors as part of their larger study described in 2.2 below.

[1] The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

1.6. New Fish Pump Intake Bulkheads. Two new intake bulkheads for AWS pumps supplying the south shore ladder will be fabricated and delivered in 2003. The bulkheads are needed so that the eight pumps can be dewatered for maintenance, two at a time. Upon delivery, both bulkheads must be tested for water leakage. This test requires a temporary shutdown of all pumps for installation of the bulkheads in two adjacent pump intakes. An outage of line 1 (turbine units 1 and 2) is also necessary for safe crane operations. It is anticipated that six pumps would operate during the actual testing. Testing will probably occur in early April at the earliest, or sometime after the peak fish passage period. Further coordination with the fishery agencies will take place as needed.

2. Studies.

2.1. Spillway Survival Study. Radio telemetry, PIT, and balloon tag studies will estimate the survival rates of test fish passing over the spillway. Project operations (spill levels and possibly patterns) will change according to a randomized block schedule. Neither the schedule nor operations are available at this time, but will be developed through SRWG and FFDRWG. This study will also involve installation of equipment on each spillway pier for the placement of antennae. This work will be completed in the January-February time frame, and may include times of tag outs for spill for diving/installation. This installation will take approximately 2 days.

2.2. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. The Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The study requires the installation of radio receivers and data loggers throughout the fishway and at various locations on the dam. The installation of equipment will take place prior to the fish passage season and is not anticipated to require special project operations. As part of this study, the fish trap in the south ladder will be operated from early July through late October. Trapping and tagging would occur four mornings per week and be completed by noon each day.

2.3. Adult Fishway Evaluation. The Walla Walla District will evaluate operational characteristics of the adult fishways in 2003. The purpose is to analyze existing operating conditions and investigate alternatives to improve fish passage, especially during times of low tailwater. This will involve adjusting diffuser gates and entrance weirs. Efforts will be made to stay within criteria, although occasional deviations will likely occur. A final report will be completed in September 2003.

APPENDIX A: LOWER MONUMENTAL

Lower Monumental Dam[1]

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season, in accordance with spill specifications in the NMFS BiOp (Appendix E) as updated in 2003 through the TMT Water Management Plan. Special daytime or nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. Nighttime spill levels may be reduced or curtailed for short periods of time on a daily or every other day basis in order to provide safe conditions for the towboat and fish barge to travel to and from the juvenile fish facilities and for loading the fish barge. Depending on flow levels, Lower Monumental pool may also need to be manipulated above MOP in order to control spill while the fish barge is loading.

1.2. New Spill Patterns. Additional spillway deflectors for bays 1 and 8 were constructed in late 2002 and early 2003. As a result, new spill patterns will be implemented in 2003 (Table LMN-9). The new patterns were developed through modeling studies at the Waterways Experiment Station and regional coordination.

1.3. Rehabilitation of AWS Pump. AWS pump 2 will be rehabbed (turbine, gearbox, and the pump itself). This requires an extended outage for that pump from December 12, 2002 to February 28, 2003. Pumps 1 and 3 will be out of service briefly beginning December 12 to allow for the installation of bulkheads in pump 2, and will then be returned to service through December 31. Pumps 1 and 3 will then need routine maintenance, requiring concurrent outages of about one month in the January-February time frame.

2. Studies.

2.1. Near-field Study of Total Dissolved Gas Exchange and Evaluation of Added Spillway Deflector Performance. As part of the COE Fastrack Gas Abatement Program, total dissolved gas abatement alternatives are being developed to reduce the TDG exchange associated with spill operations and to provide greater flexibility in scheduling spillway operations. Additional spillway deflectors for bays 1 and 8 were constructed in late 2002 and early 2003, and now all spillway bays are so equipped.

[1] The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

A field study is proposed to address the TDG exchange associated with the modified spillway and associated operations under a wide range of operating conditions. A portion of this study will be conducted during the first two weeks of April.

This study will primarily focus on determining the total dissolved gas exchange characteristics associated with spillway operation for discharges up to the design spill for a 7-day, 10-year frequency flood. Both spillway and powerhouse discharge will be systematically varied during the test with spillway discharge ranging from 2 to 10 kcfs/bay. The study will be scheduled during river flow conditions that will accommodate as wide a range of tailwater elevations as possible. The spill patterns investigated will encompass the newly established standard spill pattern and special spill patterns involving only a limited number of spill bays. The designation of alternative powerhouse loading will be scheduled to investigate the interaction of powerhouse and spillway releases. Circulation patterns below the dam will also be described through a variety of sampling devices. This information will support the interpretation of study TDG data and related issues concerning fish passage through this river reach.

2.2. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. The Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The five floating orifices (1, 3, 5, 7, and 9 numbered from north to south) will again be closed for the 2003 fish passage season. Installation of radio receivers and data loggers throughout the fishway and various locations on the dam will be required. The installation of equipment will take place prior to the fish passage season and is not anticipated to require special project operations.

2.3. Ice Harbor Spillway Survival Study. Juvenile fish will be removed from the Lower Monumental Dam daily sample and tagged with radio tags and PIT tags for a spillway survival study at Ice Harbor Dam.

2.4. Evaluation of Juvenile Fish Transportation Versus In-River Survival. The Juvenile Fish Transportation Program will be evaluated at Lower Monumental in 2003. Twenty percent of the PIT tagged fish from the Lower Granite Transport Evaluation will be returned to the river at Lower Monumental to estimate reach survival, and the remaining PIT tagged fish will be transported. Details of the study are yet to be determined.

2.5. Adult Fishway Evaluation. The Walla Walla District will evaluate operational characteristics of the adult fishway in

2003. The purpose is to analyze existing operating conditions and investigate alternatives to improve fish passage. This will involve adjusting diffuser gates and entrance weirs. Efforts will be made to stay within criteria, although occasional deviations will likely occur. A final report will be completed in September 2003.

APPENDIX A: LITTLE GOOSE

Little Goose Dam[1]

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season when seasonal average flows are projected to be 85 kcfs or higher, according to specifications in the NMFS BiOp (Appendix E) as updated in 2003 through the TMT Water Management Plan. Special daytime or nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges.

1.2. Index Testing. Index testing of two turbine units will take place in 2003. Unit 3 will be tested from January 6 to 17, and unit 4 from February 4 to 14. Units 1 to 3 are in one "family", and units 4 to 6 in another. The purpose of index testing is to determine turbine unit performance so that the unit can be operated at peak efficiency.

1.3. AWS Turbine Replacement. A turbine for one of the three AWS pumps will be replaced, requiring an outage from January 6 to February 14. The other two pumps will receive routine maintenance.

1.4. New Fish Viewing Windows. The windows in the fish ladder viewing room and fish counting slot will be replaced. This requires about two to three weeks of work in the January-February timeframe.

2. Studies.

2.1. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. The Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The four floating orifices (1, 4, 6, and 10 numbered from south to north end) will again be closed for the 2003 fish passage season. Installation of radio receivers and data loggers throughout the fishway and various locations on the dam will be required. The installation of equipment will take place prior to the fish season and are not anticipated to require special project operations.

[1] The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

2.2. Adult Fishway Evaluation. The Walla Walla District will evaluate operational characteristics of the adult fishway in 2003. The purpose is to analyze existing operating conditions and investigate alternatives to improve fish passage, especially during times of low tailwater. This will involve adjusting diffuser gates and entrance weirs. Efforts will be made to stay within criteria, although occasional deviations will likely occur. A final report will be completed in September 2003.

APPENDIX A: LOWER GRANITE

Lower Granite Dam[1]

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season when seasonal average flows are projected to be 85 kcfs or higher, according to specifications in the NMFS BiOp (Appendix E) as updated in 2003 through the TMT Water Management Plan. Special daytime or nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. During periods of high river flow, spill volumes and the elevation of Lower Granite reservoir may need to be manipulated on a daily or every other day basis to provide safe conditions for loading the fish barge at the juvenile fish facilities below the dam. Further study of the removable spillway weir (RSW) is scheduled for 2003, as outlined in 2.2 below.

1.2. Doble Tests and Transformer Rehabilitation. Transformer bank T2 will be Doble tested and rehabbed from July 15 to August 30. Turbine units 5 and 6 will be out of service at this time; headgates will be lowered on July 14. Similar work will take place on T1 from September 1 to November 30, and units 1 to 4 will be out of service.

1.3. Installation of Adult PIT Tag Detectors. A PIT tag detection system will be installed in the fish ladder. In-ladder work will require about two to three weeks in the January-February time frame. The Idaho Cooperative Fisheries Research Unit will evaluate the performance of the new detectors as part of their larger study described in 2.1 below.

1.4. New Fish Viewing Windows. The windows in the fish ladder viewing room and fish counting slot will be replaced. This requires about two to three weeks of work in the January-February timeframe.

1.5. Repair of Turbine Unit 1. Turbine unit 1 is tentatively scheduled for repairs from January 1 to March 31 that will allow for its operation during the spring. Additional repairs (rewind) are scheduled for September 15, 2003 to March 31, 2004.

[1] The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

1.6. Repair of Turbine Unit 3. Turbine unit 3 requires cavitation repair and head cover replacement. This work is scheduled for February 3 to March 28.

1.7. Removal of Surface Bypass Collector and Simulated Wells Intake. The SBC and SWI are scheduled for removal during the February-March time frame. About six weeks of work are required, as are outages for turbine units 3 to 6 (two to four units at a time).

1.8. AWS Pump Rehabilitation. AWS pump 1 will be taken out of service about December 1, 2002 for replacement of the gearbox. Therefore, it will not be available for backup if either of the other two pumps fails. Pumps 2 and 3 require various modifications during January and February 2003, and all three pumps will be out of service at this time.

2. Studies.

2.1. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. The Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The study requires the installation of radio receivers and data loggers throughout the fishway and at various locations on the dam. The installation of equipment will take place prior to the fish passage season and is not anticipated to require special project operations. As part of this study, the fish trap in the ladder will be operated from early July through late October. Some fish, tagged downstream, will be recaptured. Fish will also be outfitted with MAP tags and tracked upstream.

2.2 Removable Spillway Weir Operation. The Removable Spillway Weir (RSW) was installed in the summer of 2001. It underwent extensive biological testing in spring 2002. During the winter of 2002-03, the Surface Bypass Collector (SBC) and Simulated Wells Intake (SWI) will be removed in preparation for a second year test in spring 2003. The 2003 test will likely take place between mid-April and early June. The expected forebay elevation during testing will be between 734 and 735 feet, providing approximately 6,700 to 7,700 cfs over the RSW. It is expected that there will be two or three different spill scenarios during the testing period. Monitoring will consist of hydroacoustics, radiotelemetry and three-dimensional acoustic tag tracking. Monitoring will focus on RSW efficiency and effectiveness, and fish behavior in the vicinity of the RSW.

2.3. Evaluation of Juvenile Fish Physiological Changes. PIT-tagged juvenile spring/summer/fall chinook will be sampled at the

juvenile fish facility and taken to a laboratory for an examination of the physiological changes they experienced after release from the hatchery of origin. This will require scientists to have access to the facility and to use the PIT tag sort-by-code system.

2.4. Evaluation of the Delayed Mortality of Juvenile Fish Following Transportation. PIT-tagged juvenile salmon will be sampled at the juvenile fish facility and barged to Bonneville Dam. This will require scientists to have access to the facility and to use the PIT tag sort-by-code system. In addition, PIT-tagged fish will be held either within a barge hold in a separate container or in a tank on deck and barged to Bonneville Dam where they will be taken to a salt water rearing facility for physiological testing.

2.5. Evaluation of Juvenile Fish Transportation Versus In-River Survival. Juvenile spring/summer chinook and steelhead will be PIT tagged at the juvenile fish facility and then released into the river below the project for either in-river migration or collection and transportation at Little Goose Dam. Most fish will be tagged out of the east bank of raceways in NMFS's temporary tagging facilities. Tagging of fish from the raceways will be independent of any other facility sampling operations and will reduce the number of fish direct loaded into fish barges. At the beginning and end of the tagging operation, when fish numbers are low, fish may be tagged in the facility sampling room. This will require an increase in the normal facility sampling rate in order to get the required number of fish on marking days. The adult fish trap will also be operated in 2003 to monitor adult returns of study fish tagged in previous years.

An experimental study will be started in 2003 to evaluate the benefits of low versus high densities of steelhead on the physiology and SARs of wild chinook. This study will require that two barge holds be set-aside during the majority of the transport season. One hold will have densities near 0.1 lb/gal and the other near 0.5 lb/gal. This also requires these study groups to be held in the raceways at the facility near these same densities. During the test conditions there will be no additional loading of fish from downstream projects. The logistics for this study are under development.

Evaluation of fall chinook transport benefits will continue in 2003. These fish are marked at the hatchery, released upstream and transported from Lower Granite.

2.6. Prototype Separator Evaluation. Separation efficiencies will be evaluated for different densities of juvenile fish

passing through the prototype separator. This will be conducted using run of river fish at Ice Harbor and with fish collected from the gatewells at Lower Granite. Fish from Lower Granite will be transported by truck, and held at Ice Harbor for release into the collection channel. This study will require operation of the switch gate to the prototype separator during the test periods. A schedule of operation will be provided prior to the field season.

2.7. Adult Fishway Evaluation. The Walla Walla District will evaluate operational characteristics of the adult fishway in 2003. The purpose is to analyze existing operating conditions and investigate alternatives to improve fish passage, especially during times of low tailwater. This will involve adjusting diffuser gates and entrance weirs. Efforts will be made to stay within criteria, although occasional deviations will likely occur. A final report will be completed in September 2003.